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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/577,233

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Jan Tuma

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EXAMINER

ABRAHAM, AMJAD A

ART UNIT

PAPER NUMBER

1791

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/577,233	<b>Applicant(s)</b> TUMA, JAN	
	<b>Examiner</b> AMJAD ABRAHAM	<b>Art Unit</b> 1791	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 November 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 10, 13, 14, 16-18, 20-22, 25, 26, 28-30, 32-34, 37, 38, 40-42, 44 and 45 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10, 13, 14, 16-18, 20-22, 25-26, 28-30, 32-34, 37-38, 40-42, and 44-45 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 February 2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                        | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

Applicant's remarks and amendments, filed on November 10, 2009 and November 18, 2009, have been carefully considered. Claims 10, 13-14, 20, 22, 25-26, 34, 37-38, and 44 have been amended. Claims 11-12, 15, 19, 23-24, 27, 31, 35-36, 39, and 43 have been canceled. This leaves claims 10, 13, 14, 16-18, 20-22, 25-26, 28-30, 32-34, 37-38, 40-42, and 44-45 still pending.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 10, 13, 16-18, 20, 22, 25, 28-30, 32, 34, 37, 40-42, and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arzt et al. (WIPO Publication WO 03/099951 A2) in view of Fearing et al. (US Pre-Grant Publication 2003/0208888).

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4. **Examiner is using Arzt et al. (US Pre-Grant Publication 2006/0005362) as the English Language Equivalent of WO 03/099951).**

5. Regarding claims 10, 22, and 34, Arzt teaches a process for producing adhesion elements on a substrate (object – part 10 of figure 1). **(See abstract and figure 1).**

a. Arzt goes on to teach:

i. The use of polyvinyl siloxane as the material/object to be molded or shaped in order to form adhesion elements.

(1) **See paragraph 0103 for Polyvinyl siloxane**

(2) **See paragraphs 0086-0087 and 0094-0095 disclosing shaping/molding o the polyvinyl siloxane**

ii. Wherein the packing density is  $10^6$  to  $10^7$  per  $\text{cm}^2$ .

(3) **See paragraph 0069**

iii. The adhesion elements (projections) having a height from 20000 nm to 200 micrometers a diameter of 20 nanometers to 20 micrometers.

(4) **See paragraph 0068 to 0070**

(5) **See figure 6 show height (part a) and diameter (b)**

iv. The end is at least 20 micrometers.

(6) **See figure 6 show height (part a) and diameter (b)**

(7) **See also figures showing that flared ends can be a greater size than the ends of the projections**

v. Wherein the ends can be flared.

(8) **See Figures 7-9**

vi. Flared ends can be shaped

(9) **For claim 10 – see figure 7 (a) showing flared end (16) which is flat**

(10) **For claim 22 – see figure 7 (c) showing flared end (16) which is convex**

(11) **For claim 34 – see figure 7 (d or e) showing flared end (16) which is concave**

b. With respect to claims 10, 22, and 34, Arzt does not expressly teach wherein the viscosity is 7,000 to 15,000 mPas measured with a rotary viscosimeter.

c. However, Fearing does teach wherein making adhesive microstructures, one having the ordinary skill in the art would seek to optimize: (1) the size of the microstructures; (2) the stiffness of the microstructures; (3) the adhesive force (Fo); and (4) the packing density of the microstructures. **(See paragraphs 0072-0077)**. It is the stiffness of the microstructures that would be altered by changing or altering the viscosity of the plastic material. The stiffer the plastic material the higher the packing density.

d. It would have been obvious to one having ordinary skill in the art at the time of invention to adjust the viscosity of the adhesion element in order to create a molding material that is stiff or flexible which would lead to increased/decreased packing of the adhesive microstructures, since it has been

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held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

6. Regarding claims 13, 25, and 37, the combination of Arzt and Fearing do not teach wherein the viscosity is approximately 10,000 mPas at a shear rate of 10 (1/sec).

e. However, Fearing does teach wherein making adhesive microstructures, one having the ordinary skill in the art would seek to optimize: (1) the size of the microstructures; (2) the stiffness of the microstructures; (3) the adhesive force (Fo); and (4) the packing density of the microstructures. **(See paragraphs 0072-0077)**. It is the stiffness of the microstructures that would be altered by changing or altering the viscosity of the plastic material. The stiffer the plastic material the higher the packing density.

f. It would have been obvious to one having ordinary skill in the art at the time of invention to adjust the viscosity of the adhesion element in order to create a molding material that is stiff or flexible which would lead to increased/decreased packing of the adhesive microstructures, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

7. Regarding claims 16, 28, and 40, Arzt teaches the formation of various types of adhesion element shapes such as a concave/convex shape that must have been formed from a mold cavity having a similar shape to a hyperboloid. **(See figure 7)**.

8. Regarding claims 17-18, 29-30, and 41-42, Arzt teaches wherein the contact angle of the adhesion elements is greater than 70 degrees.

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- g. **(See paragraph 0016, 0066, and figures 4, 6, and 7-9).**
- 9. Regarding claims 20, 32, and 44, Arzt teaches wherein the height is up to 200 micro meters. **(See paragraphs 0068-0070).**
- h. The combination of Arzt and Fearing does not explicitly teach: (1) wherein the adhesion elements have a diameter of 30 micrometers and a flared end of approximately 50 micrometers.
  - vii. Moreover, Fearing does teach wherein making adhesive microstructures, one having the ordinary skill in the art would seek to optimize: (1) the size of the microstructures; (2) the stiffness of the microstructures; (3) the adhesive force ( $F_o$ ); and (4) the packing density of the microstructures. **(See paragraphs 0072-0077).** Adjusting the size of the microstructures is done to adjust the adhesion strength and the packing density and would be optimized by one having the ordinary skill in the art.
  - viii. It would have been obvious to one having ordinary skill in the art at the time of invention to adjust the size of the adhesion element in order to optimize the adhesion strength of the microstructures, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

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10. Claims 14, 26, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arzt et al. (WIPO Publication WO 03/099951 A2) in view of Fearing et al. (US Pre-Grant Publication 2003/0208888) in further view of Full et al. (US Pre-Grant Publication 2005/0072509).

11. Regarding claims 14, 26, and 38, the combination of Arzt and Fearing does not expressly teach wherein the shaping element is a drum-shaped screen having at least 16,000 mold cavities per cm<sup>2</sup>.

i. However, Arzt and Fearing both disclose that nano-imprinting (lithography) can be used to form the shaped elements as a high rate of cavities per cm<sup>2</sup>.

ix. **See Arzt at paragraph 0087**

x. **See Fearing at 0114**

j. Full further teaches the use of an imprinting roller in order to achieve the desired mold cavities per cm<sup>2</sup>. **(See Figure 11A)**. Nanoimprinting is a well known process for achieving a high number of cavities onto a surface. As Fearing has envisaged such a nano-imprinting process a roller with mold cavities like the one disclosed in Full would be a conventional choice for one having the ordinary skill in the art.

xi. This imprinting roller is the drum shaped screen having the requisite mold cavities per cm<sup>2</sup>.



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12. Claims 21, 33, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arzt et al. (WIPO Publication WO 03/099951 A2) in view of Fearing et al. (US Pre-Grant Publication 2003/0208888) in further view of George et al. (USP No. 7,018,496).

13. Regarding claims 21, 33, and 45, the combination of Arzt and Fearing does not teach wherein the plastic material is crosslinked with or after molding of the adhesion elements.

k. However, George teaches wherein thermosetting compositions can be mixed with thermoplastic compositions and crosslinked in order to achieve an adhesion element having a high ultimate strength and heat resistance. Thus it would have been obvious to cross link the plastic composition in order to make the adhesion elements stiffer.

### ***Response to Arguments***

14. Applicant's arguments with respect to claims 10, 13, 14, 16-18, 20-22, 25-26, 28-30, 32-34, 37-38, 40-42, and 44-45 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AMJAD ABRAHAM whose telephone number is

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(571)270-7058. The examiner can normally be reached on Monday through Friday 8:00 AM to 5:00 PM Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Phillip Tucker can be reached on (571) 272-1095. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AAA

/Philip C Tucker/

Supervisory Patent Examiner, Art Unit 1791